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EXAMINER
THOMAS, MIA M

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/814,302	Applicant(s) SILVERSTEIN ET AL.	
	Examiner Mia M. Thomas	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 November 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to applicant's remarks received on 13 November 2007. Claims 1-33 are pending in this application. Claims 1, 16, 21, 26 and 27 and 33 have been amended to include that "each strip is a long and narrow piece of the image." Claims 2-15, 17-20, 22-25 and 28-32 remain unamended.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.
>
> Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in Sec. 101.
>
> ... a signal does not fall within one of the four statutory classes of Sec. 101.
>
> ... signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of Sec. 101.

3. Claims 33-36 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claims 33-36 are drawn to functional descriptive material recorded on a computer readable medium. Normally, the claim would be

statutory. However, the specification, at paragraph [0027] defines the claimed computer readable medium as encompassing statutory media such as a "ROM", "hard drive", "optical drive", etc. as well as ***non-statutory*** subject mater such as a "signal". For clarity, "The media upon which the images is recorded can be any known analog or digital media and can include transmission of the images from the site of the event to the site of the image storage 110 and/or the computer 100."

> A "signal" embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the four statutory classes of § 101. Rather, "signal" is a form of energy, in the absence of any physical structure or tangible material.

Because the full scope of the claim as properly read in light of the disclosure encompasses non-statutory subject matter, the claim as a whole is non-statutory. The examiner suggests amending the claim to *include* the disclosed tangible computer readable media, while at the same time *excluding* the intangible media such as signals, carrier waves, or transmission means as suggested at paragraph [0027]. Any amendment to the claim should be commensurate with its corresponding disclosure.

Appropriate correction in this instance would include a strikethrough and deletion of the transmission upon which the media transmits the selected images of the claimed invention.

**********Examiner's Note**********:

It is noted that Figure 1, numeral 10 as taught by Peterson points to a computer system with a processor Figure 1, numeral 13, that can perform multiple tasks in the field of configuration of blended images. It is also noted that the method does not limit the structure of the "computer-based system" claimed in any way. "While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior

art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429,1431-32, Manual of Patent Examining and Procedures 2114 [R-1] ". The computer-based system as taught by Peterson is capable of and configured to perform the elements claimed by applicant and anticipates the claimed subject matter of claims 21-25.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-8, 14-16, 21, 22, 26-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peterson US (6,411,742 B1) in combination with Peleg US (2003/0076406) A1.

Regarding Claim 1: (Currently Amended)

Peterson discloses a method for blending images into a single image ("This invention relates to merging images to form a panoramic image." at column 1, line 6), comprising: selecting two images having overlapping content ("Referring to Figure 2a, images 18 depict overlapping segments of view that are common to all the images." at column 3, line 40); determining differences between the overlapping two strips ("...the positioning module 50 of the image stitching software 14 determines the relative positions of the segments..." at column 3, line 59); determining a line through the overlapping strips where the differences between the overlapping strips are minimized (Figure 3c; "The dividing line determiner 54 determines an outline 74 (Fig.

3c)...formed by aligning the current image 18b' and the reference image 18a..." at column 5, line 25 (e.g. Figure 3a, numeral 214 and 216)); and blending the two images together along the minimized line to create a single image ("Figure 2b is a panoramic image formed by the system of Figure 1 by blending the images of Figure 2a." at column 2, line 55).

Peterson does not specifically disclose dividing the two images into strips along a common plane wherein each strip is a long and narrow piece of the image; or selecting a strip of uniform width in each of the two images where the two images overlap each other

Peleg teaches:

dividing the two images into strips along a common plane wherein each strip is a long and narrow piece of the image; (Refer to Figure 6, numerals 601-604); selecting a strip of uniform width in each of the two images where the two images overlap each other (Refer to Figure 6, numeral S1-S3; " Given three input frames, 601, 602, and 603, panoramic mosaic 604 is generated by taking strip S1 from image 601, strip S2 from image 602, and strip S3 from image 603. The images are aligned so that region S1 in image 601 matches region S1 in image 602, region S2 in image 602 matches regions S2 in images 601 and 603, and region S3 in image 603 matches region S3 in image 602." at paragraph [0112]

Peterson and Peleg are combinable because they are in the same field of merging images into panoramic images (see title of each invention).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to divide the two images into two strips along a common plane wherein each strip is a

long and narrow piece of the image and selecting a strip of uniform width in each of the two images where the two images overlap each other.

The suggestion/motivation for doing so would be that "better mosaicing will result if the boundaries of the strip are taken to be approximately perpendicular to the "optical flow" (local image displacement) generated by the camera motion. Examples are camera translations: sideways motion, forward motion, and a general translation; as well as camera zoom." @ paragraph [0111].

Therefore, it would have been obvious to one of ordinary skill in the art to combine the method for blending images into a single image as disclosed by Peterson with the method for dividing the two images into strips along a common plane wherein each strip is a long and narrow piece of the image and selecting a strip of uniform width in each of the two images as taught by Peleg to obtain the invention as specifically claimed at Claim 1.

Regarding Claim 2: Peleg teaches the selected images belong to a set of two or more images comprising a scene (Refer to Figure 6, numerals 601-604).

Regarding Claim 3: Peterson discloses the selected images differ from each other based on at least recording time, camera location, camera setting, lighting, shadows, or background ("The first image 18a depicts a central segment of the front view and is centered about the entrance to the house. The second image 18b depicts an upper segment of the view to include a balcony 70

on an upper floor of the house, while the third image 18c depicts a left segment of the front view to include a tree 71 located to the left of the entrance." at column 3, line 43).

Regarding Claim 4: Peleg teaches wherein each selected image is divided into at least one strip (Refer to Figure 6, numeral S1).

Regarding Claim 5: Peleg teaches wherein the selected images are divided along a common plane (Refer to Figure 6, numeral 604; for an additional example, see Figure 7, numeral 704, paragraph [0114]).

Regarding Claim 6: Peleg teaches wherein the selected images are divided into strips along one of a vertical plane or a horizontal plane (Refer to Figure 6, numeral 601; Numerals S1 and S2 of Figure 6 are divided into strips along a vertical plane).

Regarding Claim 7: Peterson teaches wherein the two overlapping strips are selected according to a mean squared difference algorithm such that the sum of the mean squared difference values between the two selected strips is minimized ("For example, the top left corner of the doorway is horizontally displaced from the bottom left corner of the image by a distance x0 in the first images 18a, while it is displaced by a distance x1 in the second image 18a.Consequently the second image is displaced to the left of the first image by a distance (d-left) given by the mathematical equation: d-left = x0-x1." at column 4, line 12).

Regarding Claim 8: Peleg teaches cutting the selected images along the minimized line (Refer to Figure 6, numeral 601, item S2 ("dotted dashed lines") and numeral 603, item S2 ("dotted

dashed lines") and joining the cut images together to create the single image of the scene (Refer to Figure 6, numeral 604).

Regarding Claim 14: Peterson discloses wherein the blending of images is performed iteratively ("Referring to Figure 2B, image stitching software 14, blends the images 18a-18d so to generate a single panoramic image 26…" at column 3, line 52), with the blended single image being utilized as one of the selected two images to be blended ("If there are more images, the stitching software 14 sets (224) the reference image to be the next image after the current image and repeats the process…" at column 5, line 48).

Regarding Claim 15: Peterson discloses wherein the method of blending is performed iteratively (Figure 2B describes the method of blending images iteratively by blending any of images 18a-18d; "…image stitching software 14, blends the images 18a-18d so to generate a single panoramic image 26…" at column 3, line 52) until all images comprising the scene have been blended into a final single image of the scene ("Consequently, additional processing is required to blend the images into each other and create the near seamless panoramic image 26 (Figure 2B)." at column 4, line 45).

Regarding Claim 16:

Peterson discloses a method for blending two images into a single image ("This invention relates to merging images to form a panoramic image." at column 1, line 6), determining a line through the overlapping strips where differences between the overlapping strips are minimized (Figure 3c; "The dividing line determiner 54 determines an outline 74 (Fig. 3c)…formed by aligning the current image 18b' and the reference image 18a…" at column 5, line 25 (e.g. Figure

3a, numeral 214 and 216)); blending the two images along the determined minimized line to create a single image ("Figure 2b is a panoramic image formed by the system of Figure 1 by blending the images of Figure 2a." at column 2, line 55).

Peterson does not specifically disclose dividing two images into strips along a common plane wherein each strip is a long and narrow piece of the image; selecting a strip of uniform width in each image where the two images overlap and warping the single image to minimize blurring along the blending line.

Peleg teaches dividing two images into strips along a common plane wherein each strip is a long and narrow piece of the image; (Refer to Figure 6, numerals 601-604); selecting a strip of uniform width in each image where the two images overlap (Refer to Figure 6, numeral S1-S3; " Given three input frames, 601, 602, and 603, panoramic mosaic 604 is generated by taking strip S1 from image 601, strip S2 from image 602, and strip S3 from image 603. The images are aligned so that region S1 in image 601 matches region S1 in image 602, region S2 in image 602 matches regions S2 in images 601 and 603, and region S3 in image 603 matches region S3 in image 602." at paragraph [0112] and warping the single image to minimize blurring along the blending line (Refer to Figure 8, numeral 801-804, 810-812, 820-822).
Peterson and Peleg are combinable because they are in the same field of merging images into panoramic images (see title of each invention).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to divide the two images into two strips along a common plane wherein each strip is a long and narrow piece of the image; select a strip of uniform width in each of the two images

where the two images overlap; and warp the single image to minimize blurring along the blending line.

The suggestion/motivation for doing so would be that "better mosaicing will result if the boundaries of the strip are taken to be approximately perpendicular to the "optical flow" (local image displacement) generated by the camera motion. Examples are camera translations: sideways motion, forward motion, and a general translation; as well as camera zoom." @ paragraph [0111]. Warping also allows the user of this method to form, shape, bend and stretch the images to obtain a best match for providing a seamless match of a blended single image.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the method for blending images into a single image as disclosed by Peterson with the method for dividing the two images into strips along a common plane wherein each strip is a long and narrow piece of the image and selecting a strip of uniform width in each of the two images and warping the single image to minimize blurring along the blended line as taught by Peleg to obtain the invention as specifically claimed at Claim 16.

Regarding Claim 21: Claim 21 equally discloses the claimed invention of Claim 1. Claim 21 is rejected for the same reasons as listed above at Claim 1. Claim 21 is the computer based system of the claimed method of Claim 1.

Regarding Claim 22: Claim 22 equally resembles the claimed elements of Claim 7. Claim 22 is rejected for the same reasons as listed above at Claim 7. Claim 22 is the computer bases system of the claimed method of Claim 7.

Regarding Claim 26: Claim 26 equally discloses the claimed invention of Claim 1. Claim 26 is rejected for the same reasons as listed above at Claim 1. Claim 26 is the system of the claimed method of Claim 1 with means plus function language.

Regarding Claim 27: Peterson discloses a system for blending images into a single image ("Figure 1 is a block diagram of a system for blending images of overlapping segments of view..." at column 2, line 51), comprising: a first computing module dividing two images having overlapping content into strips along a common plane in at least one region of overlap wherein each strip is a long and narrow piece of the image; (Performed by the portion of Figure 1, numeral 13; "The process begins when the image capture software 12 (FIG. 1) captures (200) the images 18 (FIG. 1) that are to be blended. The positioning module 50 (FIG. 1) determines (202) the position of the segment of the view corresponding to the each image 18b-18d relative to the segment of the view corresponding to the first image 18a (as previously described with reference to FIGS. 2C and 2D)..." at column 4, line 67); a second computing module calculating difference values between the pixels of the two images in [[the]] corresponding strips of uniform width in the at least one region of overlap (For example, "Referring to Figure 1, the positioning module 50 of the image stitching software determines the relative positions of the segments..." at column 3, line 59); a third computing module determining a cut line through the two images where the difference values are minimized (For example, "The dividing line determiner 54 then determines which of the two sections has less of the current image 18b' that is not overlapped by the reference image 18a and sets (220) that section of the current image to be invisible." at column 5, line 36); and a fourth computing module blending the two images along the cut line to create a blended single image (For example, "The blending mask determiner smoothes the

intersection between the region 82 with pixel values set to 1 and the region 84 with pixel values set to 0…" at column 5, line 60). It is noted that the processor, Figure 1, numeral 13 of the computer based-system of Peterson is capable of performing and possessing the computing modules of claim 27. It is also noted that the subject matter of claim 1 and 16 does not limit the structure of the claimed computer based system of claim 27. It is also important to note that Peterson discloses the system with the claimed elements listed here at Claim 27, however, the combination of Peterson with Peleg disclosed the functionality of the system associated with these claimed elements.

Regarding Claim 28: Peterson discloses the system (Refer to Figure 1, numeral 10) including selecting two overlapping strips according to a mean squared difference algorithm such that the sum of the mean squared difference values between the two strips is minimized (Performed by the portion of Figure 1, numeral 50) "If the outlines of the aligned images intersect at more than two points, the dividing-line determiner 54 selects the two intersection points that are furthest apart from each other to define the dividing line 80." at column 5, line 32).

Regarding Claim 29: Peterson discloses the system (Refer to Figure 1, numeral 10) including: a fifth computing module cutting the two images along the cut line (Performed by the portion of Figure 1, numeral 54); and a sixth computing module joining the cut images together to create the single image (Performed by the portion of Figure 1, numeral 58; "Determining the position of the segment depicted in the second image relative to the segment in the first allows the method to blend images that may represent segments of the view that are arbitrarily positioned relative to each other. It also allows the method to blend images that may have arbitrary shapes and sizes." at column 1, line 51).

Regarding Claim 30: Peterson discloses the system (Refer to Figure 1, numeral 10) wherein at least one of the cut images is warped along the cut line to improve the fit between the two images along the cut line (Performed by Figure 1, numeral 56; "Refer to Figure 2b; "Thus, the image stitching software 14 allows a user to blend multiple images 18a-18d to create a panoramic image 26 with a field of view that is larger than the field of any one of the multiple images." at column 3, line 52).

Regarding Claim 31: Peterson discloses the system (Refer to Figure 1, numeral 10) wherein the blending of images is performed iteratively, with the blended single image being utilized as one of the two images to be blended ("The stitching software 14 checks (222) whether there are any more images between the reference image 18a and the current image 18b'. If there are more images, the stitching software 14 sets (224) the reference image to be the next image after the current reference image and repeats the process of setting a section of the current image 18b' invisible 208-220 described above." at column 5, line 46).

Regarding Claim 32: Peterson discloses the system wherein the system is included in one of a video camera or a digital camera ("For example, the image 18 to be blended may be obtained from a digital camera, storage 16 or a network 26." at column 7, line 17).

Regarding Claim 33: Claim 33 equally discloses the claimed invention of Claim 1. Claim 33 is rejected for the same reasons as listed above at Claim 1. Claim 33 is the computer readable medium encoded with software that resembles the claimed method of Claim 1. Peterson discloses ("In general, another aspect of the invention relates to an article that includes a

computer readable medium, which stores computer-executable instructions for blending images of segments of a view according to the method described above." at column 1, line 46).

Regarding Claim 34: Claim 34 equally resembles the claimed invention of Claim 3. Claim 34 is rejected for the same reasons as listed above at Claim 3. Claim 34 is the computer readable medium encoded with software that resembles the method of Claim 3.

Regarding Claim 35: Claim 35 equally resembles the claimed elements of Claim 7. Claim 35 is rejected for the same reasons as listed above at Claim 7. Claim 35 is the computer readable medium encoded with software that resembles the method of Claim 7.

6. Claims 9-11, 23, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peterson US (6,411,742 B1) in combination with Peleg US (2003/0076406) A1 hereinafter referred to as Peleg '406 and further in view of Peleg et al. (US 6,434,280 B1), hereinafter referred to as Peleg '280.

Regarding Claim 9:

The combination of Peterson and Peleg '406 discloses all the claimed elements as rejected above.

Peterson and Peleg' 406 does not specifically disclose the claimed elements of claim 9 as listed below, however, Peleg '280 teaches: calculating a squared color difference value for each pixel pair between the overlapping strips; ("The computer system 10...can perform processing operations..."at column 3, line 46, ") converting the squared color difference values into a gray

scale image of the overlapping strips, ("If the image frames 20(n) are in color form, the image data associated with the color space components can be processed separately..."at column 5, line 19); wherein the brightest pixels in the gray scale image correspond to the pixels of greatest difference between the two overlapping strips ("If, for example, eight bits are used for each pixel, two hundred and fifty six (that is, (2^8) intensity values may be represented for each pixel, extending from, for example, zero for a black pixel to two hundred and fifty five for a white pixel." at column 5, line 8); sorting the gray scale pixels from largest to smallest difference value ("It will be appreciated that the number of possible intensity values that may be represented for each pixel will depend on the number of digital data bits which are used in the representation of the pixel value associated with the pixel." at column 5, line 4); for each sorted gray scale pixel, mapping the gray scale pixel to one of two regions within the overlapping strip according to the adjacency of the gray scale pixel to the one of the two regions ("In either case, the digital data representing image frames 20(n) may be provided to the computer 10...If the image frames 20(n) are in monochrome form, such as in gray scale form, the pixel value associated with each pixel will generally comprise a single numerical value that identifies the intensity level of the region of the respective image frame with which the pixel is associated..." at column 4, line 65); determining a cut line between the two regions ("In that process, the super-resolution generator divides the mosaic image into a plurality of patches..." at column 3, line 2); cutting each selected image along the cut line within the overlapping strip of each selected image (See Figure 3a, numerals 100-104; "After generating enhanced resolution mosaic image in step 106, the super-resolution processor 24 performs the super-resolution operation in connection with each of the patches and the image frames 20(n) associated therewith." at column 7, line 5); and combining the two cut selected images along the cut line to form the single image ("In accordance with the invention, ... generates from the image frames 20(n), the super-resolution-

enhanced mosaic image 22 as a single mosaic image... with improved image quality and resolution..." at column 5, line 55).

Peterson, Peleg '406 and Peleg '280 are combinable because they are in the same field of generating panoramic mosaic images (see title of each invention).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to calculate a squared color difference value for each pixel pair between the overlapping strips; convert the squared color difference values into a gray scale image of the overlapping strips, wherein the brightest pixels in the gray scale image correspond to the pixels of greatest difference between the two overlapping strips; sort the gray scale pixels from largest to smallest difference value; for each sorted gray scale pixel, mapping the gray scale pixel to one of two regions within the overlapping strip according to the adjacency of the gray scale pixel to the one of the two regions cutting each selected image along the cut line within the overlapping strip of each selected image and combining the two cut selected images along the cut line to form the single image.

The suggestion/motivation for doing so would have been to create a more efficient mathematical manipulation (algorithm) for progressively and effectively calculating, converting, sorting, cutting, and combining the strips of the image to form a single blended image.

Therefore, it would have been obvious to one combine the method of blending or merging images as disclosed by the combination of Peterson and Peleg '406 with method as taught by Peleg '280 to obtain the invention as specified at Claim 9.

Regarding Claim 10: Peterson discloses wherein the cut line is determined between a first region and a second region to which the pixels have been mapped ("The second image is divided into the first and second section by a dividing line that is determined based on an outline of the first image..." at column 2, line 22).

Regarding Claim 11: Peterson discloses wherein the cut line corresponds to the line of best match between the overlapping strips ("For example, a seam 62 is created...where the two images 18c and 18d join each other...and create a near seamless panoramic image 26 (Figure 2b) ", at column 4, line 42).

Regarding Claim 23: Claim 23 equally resembles the claimed elements of Claim 9. Claim 23 is rejected for the same reasons as listed above at Claim 9. Claim 23 is the computer based system of Claim 9.

Regarding Claim 36: Claim 36 equally resembles the claimed elements of Claim 9. Claim 36 is rejected for the same reasons as listed above at Claim 9. Claim 36 is the computer readable medium encoded with software that resembles the method of Claim 9.

7. Claims 12, 13, 17-20, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peterson US (6,411,742 B1) in combination with Peleg US (2003/0076406) A1 hereinafter referred to as Peleg '406 and further in view of Xiong et al (US 6,434,265 B1).

Regarding Claim 12:

The combination of Peterson and Peleg ‘406 discloses all the claimed elements as rejected above.

Peterson and Peleg ‘406 does not specifically disclose at least one of the cut images is warped along the cut line to improve the fit between the two cut images along the cut line. However, Xiong teaches wherein at least one of the cut images is warped along the cut line to improve the fit between the two cut images along the cut line (“The present invention is designed to calibrate and align all such 2D rectilinear images with respect to one another and globally, blend the images where they overlap, and construct a reconstructed and relatively error free 3D panorama image, shown conceptually in 2D form as FIG. 1(b), for any arbitrary geometry.” at column 3, line 47).

Peterson, Peleg ‘406 and Xiong are combinable because they are in the same field of creating high quality virtual panoramas. (See abstract Xiong).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to calculate that [wherein] at least one of the cut images is warped along the cut line to improve the fit between the two cut images along the cut line.

The suggestion/motivation for doing so would have been to “yield dramatic improvements during the mathematical, authorization processes and projection cycles with speeds up to several order of magnitude faster than any prior system.” (Abstract, Xiong).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the claimed elements as rejected above by the combination of Peterson and Peleg '406 with the method as disclosed by Xiong to obtain the invention as specified at Claim 12.

Regarding Claim 13: Xiong teaches wherein a Gaussian function is used to warp the at least one cut image ("The third step re-projects all images...by employing Laplacian pyramid based blending using a Gaussian blend mask..." at column 2, line 18).

Regarding Claim 17:

The combination of Peterson and Peleg '406 discloses all the claimed elements as rejected above.

Peterson and Peleg '406 does not specifically disclose wherein the minimized line is determined by calculating mean squared difference values for pairs of pixels between the two overlapping image strips.

Xiong teaches wherein the minimized line is determined by calculating mean squared difference values for pairs of pixels between the two overlapping image strips ("Different combinations of overlapping areas are tried to achieve the optimal overlap between images (or, equivalently, the smallest error in the error function or pair wise objective function described herein) using the steps described herein, which generally minimizes the average squared pixel intensity (e.g., brightness and contrast) difference with respect to certain transformation parameters." at column 4, line 65).

Peterson, Peleg '406 and Xiong are combinable because they are in the same field of creating high quality virtual panoramas. (See abstract Xiong).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to calculate that [wherein] the minimized line is determined by calculating mean squared difference values for pairs of pixels between the two overlapping image strips.

The suggestion/motivation for doing so would have been to "yield dramatic improvements during the mathematical, authorization processes and projection cycles with speeds up to several orders of magnitude faster than any prior system." (Abstract, Xiong). Xiong also teaches that "though 3D modeling via equations, [the user] has certain advantages, such as a depiction of a scene from any arbitrary vantage point, creating images from equations generated by a computer is seriously limited by the speed of the computer." (Xiong column 1, line 31)

Therefore, it would have been obvious to one of ordinary skill in the art to combine the claimed elements as rejected above by the combination of Peterson and Peleg '406 with the method as disclosed by Xiong to obtain the invention as specified at Claim 17.

Regarding Claim 18: Xiong teaches wherein at least one of the images is warped where the differences between the selected strips along the blending line exceed a predetermined threshold (Where the images overlap there is potential for misalignment when constructing a 3D panorama, as indicated by blurry lines 112, for a variety of reasons, ... distortions that occur

when warping a 2D image to construct a 3D image space. The present invention is designed to calibrate and align all such 2D rectilinear images with respect to one another and globally, blend the images where they overlap, and construct a reconstructed and relatively error free 3D panorama image, shown conceptually in 2D form as FIG. 1(b), for any arbitrary geometry." at column 3, line 41).

Regarding Claim 19: Xiong teaches wherein the single image is warped by application of a Gaussian function ("The Gaussian pyramid may be constructed by applying a low-pass filter to the blend mask, which dilutes the sharp edges, from linear interpolation between the black and white regions of the blend mask, or from other techniques." at column 15, line 48).

Regarding Claim 20: Xiong teaches where the Gaussian function is applied iteratively along a plurality of planes and with a plurality of magnitudes of warp to determine the best fit between the images ("The local pair wise registration module 222 iterates until the entire Gaussian pyramid is traversed...and working out the finest level resolution, as indicated in decision box 324." at column 5, line 27).

Regarding Claim 24: Claim 24 equally resembles the claimed elements of Claim 17. Claim 24 is rejected for the same reasons as listed above at Claim 17. Claim 24 is the computer based system of Claim 17.

Regarding Claim 25: Claim 25 equally resembles the claimed elements of Claim 18. Claim 25 is rejected for the same reasons as listed above at Claim 18. Claim 25 is the computer based system of Claim 18.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1, 16, 21, 26, 27 and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "long and narrow" in independent claims 1, 16, 21, 26, 27 and 33 is a relative term which renders the claim indefinite. The term "long and narrow strips" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. How long is a long a narrow piece? How narrow is a long and narrow strip? According to applicant's remarks, applicant relies on The American Heritage Dictionary for the plain and basic meaning of the word strip, however, applicant does not completely describe or point out how long a strip a paper is nor how narrow a piece of beef may be? A image can be as long as a piece of paper (standard 8 x 11) or as long as 2 miles. Additionally, an image maybe as narrow as 3 x 5 inches (as in a digital camera) or as narrow as car in comparison to a mack truck. Appropriate correction to the relative term "long and narrow" is required.

Response to Arguments

Drawings

10. Applicant's arguments, see page 11, filed 13 November 2007, with respect to Drawings have been fully considered and are persuasive. The objection of Figures 4-10 has been withdrawn. It is important to note that Figure 4 does illustrate the strips 404 and 406 of the two

images. However, the lines which support the difference between numeral 404 and numeral 406 are not as clearly shown in black and white as they are compared to the scanned drawings.

Claim Rejections - 35 USC § 102

Claim Rejections - 35 USC § 103

11. Applicant's arguments with respect to claims 1-8, 14, 15, and 21-26 under 102(b) as being anticipated by Peterson have been considered but are moot in view of the new ground(s) of rejection.

Claims 16-20 were rejected under 103(a) as being unpatentable over Peterson in combination with Xiong. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Summary of Remarks: @ page 11---Neither Peterson nor Xiong teach or suggest the <u>"dividing the two images into strips wherein each strip is a long and narrow piece of the image".</u> As illustrated in Figure 4 of Applicant's disclosure; each of the images is divided into strips illustrated as long and narrow pieces of each image. Additionally, Peterson or Xiong along or in combination teach "selecting a trip of uniform width in each of the two images where the two images overlap each other" and "determining a line through the overlapping strips where the differences between the overlapping strips are minimized."

Examiner's Remarks: Examiner does not fully agree nor disagree with applicant's remarks. Examiner has shown in the rejection of independent claims 1, 16, 21, 26, 27 and 33 that the

terms "long and narrow strips" are relative claim language. Since Peterson is showing a full image of a "door" with other "outside images", Examiner contended that the shapes and regions of the claimed invention were demonstrated and anticipated by Peterson. However, Applicant has amended the aforementioned independent claims to include the terms long and narrow, leading the Examiner to reply with new grounds of rejection after fully considering the applicant's arguments. The combination of Peterson with Peleg '406 fully demonstrates long and narrow strips of the image being generated/blended into panoramic images. Peterson "fits different images containing portions of the same subject matter onto a clean canvas and fits pieces together by masking those portions not to be visible." Examiner contends that though this imaging approach may seem different from the claimed strip approach, because "long and narrow strips" are not clearly defined by the claim language presented, the approach of Peterson broadly reads on the amended claim language.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mia M. Thomas whose telephone number is 571-270-1583. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Mia M Thomas
Examiner
Art Unit 2624

VIKKRAM BALI
PRIMARY EXAMINER